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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/773,800	02/06/2004	Yuan-Heng Fan	021653-003100US	8468
20350	7590	06/03/2005	EXAMINER	
TOWNSEND AND TOWNSEND AND CREW, LLP TWO EMBARCADERO CENTER EIGHTH FLOOR SAN FRANCISCO, CA 94111-3834			LEE, GRANVILL D	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No. 10/773,800	Applicant(s) FAN, YUAN-HENG	
	Examiner Granvill D. Lee Jr	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 August 2004.  
 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-18 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☒ The drawing(s) filed on 06 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \* c) ☐ None of:  
         1. ☒ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 4, 6, 11, 13, 14 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Oh et al. (US. Pub. 2004/0134974).

In view of these claims (esp. 1 and 11) Oh et al. discloses an integrated circuit chip comprising, a substrate (Para 28), the substrates comprising a plurality of chip structures, a plurality of bonding pads (Fig, 4a #402) disposed on the substrate, with each of the bonding pads being formed from an aluminum bearing material (Para. 7 & 37). Oh et al. shows a surface region formed as a portion of the contact pad (#402) but bounded by layers #404 and #406 (Fig. 4a). Oh et al. continues to show an under bump (#406) metal layer (UBM) making contact (Para. 11) to solder bumps (#405), a wetting layer (Para. 28) containing extensions or protrusions of the wetting layer, disposed spatially, and a bump layer over the wetting layer coupled to the plurality of protrusions (#411).

In view of claims 3 and 13, Oh et al. details each of the protrusions has a predetermined height and a predetermined width (Para. 29).

In viewing claims 4 and 14, Oh et al. depicts each of the protrusions has a predetermined height, the height ranging from about 15 to about 20 microns (Para. 29).

In view of claims 6 and 16, the Oh et al. wetting layer is provided by a deposition (Para. 42) or plating process (Para. 34).

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5,7-9, 15 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh et al. in view of Farnsworth et al. (US Pat. 6,687,989).

In view of claims (esp. clms. 5 and 15), Oh et al. discloses an integrated circuit chip comprising substrates comprising a plurality of chip structures, a plurality of bonding pads disposed on the substrate, an under bump metal layer (UBM) making contact to solder bumps, a wetting layer containing extensions or protrusions. However, Oh et al. fails to consider use of bonding pads of dimensions of about 100 by 100 microns. But, Farnsworth et al. discloses a teaching where the bond pads consist of an area 100 by 100 microns (Col. 4 lines 22-26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the UBM teachings of Oh et al. with preference for Farnsworth et al. in the likelihood of fabricating a device with a number of versatile designs, that some permanent structures of the device must be sized to accommodate all the variations. Oh et al. discovered that differing patterns of the design would be used in making the spaced projections

different, and that these different design patterns are ascribed an area which can accommodate all possibilities (Col. 4 lines 18-30).

In view of claims 7 and 17, where Farnworth et al. makes a number of protrusions using an electroless process prevents the contact pad or protrusions from softening (Col. 5 lines 33-45).

In view of claims 8-9 and 18, Farnworth et al. discloses silicon substrate (Col. 1 lines 30-35) or silicon on glass insulator (Col. 2 lines 2-6).

Claims 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh et al. in view of Yu et al. (US Pat. 6,593,220).

In view of these claims, Oh et al. discloses an integrated circuit chip comprising substrates comprising a plurality of chip structures, a plurality of bonding pads disposed on the substrate, an under bump metal layer (UBM) making contact to solder bumps, a wetting layer containing extensions or protrusions. Yet, Oh et al. fails to suggest that the under bump metal layer comprises, an adhesive, a wetting and a protective material. Yu et al. makes an under bump metal layer comprised of an adhesive material, a passivation material, and a barrier protective material.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the UBM teachings of Oh et al. with those Yu et al. with the prospect of using three layers for the UBM layer with multi-purposes. The quest of Yu et al. was to find materials that supplied

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specific purposes in the final formation of the UBM layer, and found that improved adhesion using chromium, diffusion prevention using copper and gold for protection appeared to be the best combination for the UBM layer (Col. 8 lines 30-40).

### ***Contact Information***

Any inquiry concerning this communication or earlier communications for the examiner should be directed to Granvill Lee whose telephone number is (571) 272-1897. The examiner can be normally reached on Monday thru Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are not successful, the examiner's supervisor, Bill Baumeister can be reached on (571) 272-1722. The fax phone number for this group is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

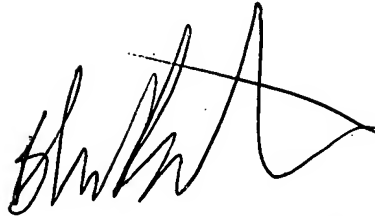
Examiner

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Gl  
4/27/05

A handwritten signature in black ink, appearing to read 'B. William Baumeister', with a large, stylized flourish at the end.

**B. WILLIAM BAUMEISTER  
SUPERVISORY PATENT EXAMINER**